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The Present Invention

The present application is directed generally to processes for preparing poly(trimethylene terephthalate) bulk continuous filament yarn (claims 1, 3, 4, 6-8, 11-17, 20, 22-27, 29-34, 36-38, 41 and 43-56), and a carpet prepared from a ply-twisted, heat-set poly(trimethylene terephthalate) produced from a specified process (claim 42).

As discussed below, it is in general known to prepare poly(trimethylene terephthalate) bulk continuous filament yarn by the process of:

- (a) spinning molten poly(trimethylene terephthalate) into filaments;
- (b) converging the filaments;
- (c) cooling the filaments;
- (d) drawing the filaments; and
- (e) bulking the drawn filaments.

What distinguishes the presently claimed invention (in part) from this generally known process is a combination of several specific operating parameters that allow, in the context of a continuous bulk yarn process, the filaments to be drawn at very high speeds of greater than 3000 meters per minute. The ability to draw the filaments at this high speed results in a significant productivity increase versus the processes known at the time the present application was filed.

In its broadest context (claim 1), this combination of operating parameters includes:

- (i) the poly(trimethylene terephthalate) having a number average molecular weight of about 26500 to about 40000;

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(ii) the poly(trimethylene terephthalate) having an intrinsic viscosity of about 0.95 to about 1.04 dl/g;

(iii) the poly(trimethylene terephthalate) having a melt viscosity of about 350 up to about 700 Pascals at 250°C and 48.65 per second shear rate; and

(iv) drawing the filaments to an individual filament denier of greater than 10, and a converged filament (yarn) denier greater than 210.

It must again be stressed that it is this combination of operating parameters, and not any one individually, that is required by the present claims in order to draw the filaments at high speeds as presently claimed, with a significantly increase productivity of bulked continuous poly(trimethylene terephthalate) filaments as a resulting process advantage.

#### The Primary Reference

As correctly recognized by the Examiner, Howell et al does generally disclose a process for preparing poly(trimethylene terephthalate) bulk continuous filament yarn comprising steps (a-e) as broadly described above. Howell et al also discloses the following relevant operating parameters:

an intrinsic viscosity of from 0.6 to 1.3 dl/g, and preferably from 0.8 to 1.1 dl/g; and

an individual filament denier of from 4 to 25; and

a converged filament (yarn) denier greater of from 700 to 5000.

Howell et al also generally discloses that the disclosed process can be operated so that the filaments are drawn at speeds of at least 800 m/min.

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The conditions of polymer molecular weight and melt viscosity are not specified in Howell et al, nor is the relatively narrow intrinsic viscosity operating range.

In the only specific example provided in Howell et al (Example 1), the poly(trimethylene terephthalate) had an intrinsic viscosity of 0.90, the resulting individual filament denier was 15, and the converged filament (yarn) denier was 1200. Under these conditions, the draw speed was only 2177 yd/min (about 1990 m/min). Thus, the conditions specified in the present claims provide and require an at least 50% increase in the draw speed as compared to the conditions utilized in Example 1 of Howell et al.

Based upon these established differences between the claimed invention and the teaching of the Howell et al reference, the disclosure of the Howell et al reference would need to be modified in order to arrive at the presently claimed invention. To do so for obviousness purposes, there must exist some supportable reason, suggestion or motivation which would lead the person of ordinary skill in the art to modify the disclosure of the Howell et al reference in the manner required to arrive at the presently claimed invention. See In re Chu, 36 U.S.P.Q. 2d 1089, 1094 (Fed. Cir. 1995). The mere fact that the prior art could be so modified does not make the modification or arrangement obvious unless the prior art suggests the desirability of such. See In re Gordon, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

#### The Secondary References and Patentability

Hwo et al is cited by the Examiner as teaching a draw speed of poly(trimethylene terephthalate) of from 2450 to 10000 m/min. While Hwo et al does in fact teach this number, the teaching is in the context of a partially-oriented yarn process, not a bulk continuous yarn process as set forth in the present claims. Hwo et al in fact gives no indication whatsoever as to how to adjust a bulk continuous yarn process in order to achieve these high draw speeds.

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Wandel et al is cited by the Examiner as disclosing a poly(trimethylene terephthalate) having a melt viscosity as specified in claim 1. While Wandel et al does show that poly(trimethylene terephthalate) of an appropriate melt viscosity exists, Wandel et al does not in any way disclose or suggest the use of such poly(trimethylene terephthalate) in a bulk continuous yarn process, or how such use might affect the operation or results of such a process.

In a similar manner, Sun et al is cited by the Examiner as disclosing a poly(trimethylene terephthalate) having a molecular weight as specified in claim 1. While Sun et al does show that poly(trimethylene terephthalate) of an appropriate molecular weight exists, Sun et al does not in any way disclose or suggest the use of such poly(trimethylene terephthalate) in a bulk continuous yarn process, or how such use might affect the operation of such a process.

It is well established that a reference is only good for what it fairly teaches. As described in detail above, the present invention is not simply increasing the draw speed in a conventional bulk continuous yarn process - it is the selection of a specified combination of operating parameters that allows such draw speed to be significantly increased. As also discussed above, none of the secondary references in any way teach or remotely suggest how to adjust a bulk continuous yarn process in order to achieve high draw speeds as set forth in the claims.

It seems to be the position of the Examiner that the difference between the claimed invention and Howell et al can be characterized as a mere optimization, thus modifying Howell et al as required to achieve the presently claimed invention involves only routine skill and should be considered obvious. This position of the Examiner might in some instances be supportable if only one parameter was altered, and the relative effect of altering that one parameter was in a general sense predictable by a person of ordinary skill in the

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relevant art. In that instance, clearly only routine skill would be utilized.

The above straightforward situation, however, does not describe the differences between the presently claimed invention and teaching of the Howell et al disclosure. The presently claimed invention is not merely a simplistic optimization of the disclosure of Howell et al, but rather an overall selection of a combination of operating parameters that allows a significant increase in the draw speeds as compared to what is disclosed in the Howell et al reference.

While at most the person of ordinary skill in the art may try to manipulate one or more of the process parameters in order to achieve the result of faster draw speeds, the standard of obviousness is not "obvious to try". In re Tomlinson, Hall, and Geigle, 150 U.S.P.Q. 623, 626 (C.C.P.A. 1966). Instead, as discussed above, there must exist some reason, suggestion or motivation for modifying the specific combination of process parameters as set forth in the present claims, and the present record is completely devoid of any supportable such reason, suggestion or motivation.

In fact, the only way to arrive at the presently claimed invention from the fair disclosures of the various references is with hindsight benefit of the Applicants' disclosure and claims. Hindsight, however, is an inappropriate perspective in which to judge patentability. In re Deminski, 230 U.S.P.Q. 313, 316 (Fed. Cir. 1986).

#### Conclusion

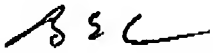
In view of the above, the Applicants submit that, on the present record, the Examiner has not established a *prima facie* case of obviousness of the claims in this application, and that these claims are in fact patentable over any supportable combination of the cited references.

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The Applicants, therefore, respectfully request withdrawal of the obviousness rejection of record, allowance of the claims as currently pending, and advancement of the present application to issue at the earliest possible date.

Respectfully submitted,

  
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